

Short Communications

Influence of Irrigation and Spacing on Yield Quality Water Use and Economic of Rustica Tobacco (*Nicotiana rustica* L.)

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One of the measures for obtaining higher yield of rustica tobacco, an important nonfood cash crop of North Gujarat, is adoption of optimum plant population under different water regimes to provide each plant an adequate opportunity for CO_2 assimilation and dry matter production. To determine the effect of irrigation schedules and spacings on yield, quality and water use, an experiments with rustica tobacco cv. 'GC 2' was carried out in split plot design with four replications during *rabi* 1996 in loamy sand soil of Sardar Krushinagar. Irrigation schedules (0.5, 0.7, 0.9 and 1.1 IW : CPE ratios) were taken in main plots and spacings (75 cm X 45 cm, 75 cm X 60 cm, 60 cm X 45 cm and 60 cm X 60 cm) in sub-plot. The soil was neutral in pH, containing 181, 42 and 104 kg/ha of available N, P and K, respectively. The field capacity, permanent wilting point and bulk density were 8.94%, 2.84% and 1.59 g/cc, respectively. All recommended cultural operations were carried out as per need of crop.

Irrigating the crop at 1.1 IW : CPE ratio (16 irrigations) produced the highest cured leaf and dry stalk yields and was at par with 0.9 ratio (14 irrigations). Both the ratios were significantly

superior to rest of the IW : CPE ratios (Table-1). Higher yield with more number of irrigations might to due to proper utilization of nutrients and also better formation and accumulation of photosynthates. Spangle score of leaf progressively increased while total N content of leaf progressively decreased with successive increase in IW : CPE ratios from 0.5 to 1.1. Limited supply of water under low IW : CPE ratios (0.5 and 0.7) produced statistically identical nicotine content which was significantly higher than that of adequate supply of water (0.9 and 1.1 IW : CPE ratios). Decreased in total nitrogen and nicotine content of leaf with increase in number of irrigations might be due to dilution effect as there was increase in yield by about 37% over 0.5 IW : CPE ratio. Consumptive use of water increased with increase in IW : CPE ratios from 0.5 to 1.1, while water use efficiency decreased with increase in IW : CPE ratios. Maximum net realization (Rs. 23,283/ha) and BCR (2.36) were obtained with 0.9 IW : CPE ratio. These results confirm the finding of Chaudhary, 1995.

Among the 4 spacings, significantly the highest cured leaf and dry stalk yields were recorded under 60 cm X 60 cm spacing. While the lowest yields were obtained under narrow spacing of 60 cm X 45 cm. This might be due to more competition for resources such as space, nutrient, moisture and radiation under narrow spacing. Crop sown at 75 cm X 60 cm produced the highest spangle score, total nitrogen and nicotine content of leaf, which was at par with that of 60 cm X 60 cm but appreciably higher than 60 cm X 45 cm and 75 cm X 45 cm spacings.

TABLE 1

Effect of irrigation and spacing on yield, quality, water use and economics of rustica tobacco.

Treatments	Spangle score (0-4)	Cured leaf yield (kg/ha)	Stalk yield (kg/ha)	Total N (%)	Nicotine content (%)	CU (mm)	WUE (kg/ha-mm)	Net realization (Rs/ha)	Benefit : Cost ratio
IW : CPE ratio									
0.5	1.62	2,165	471	2.96	5.27	401	5.40	9,889	1.59
0.7	2.06	2,890	574	2.87	5.25	540	5.35	18,562	2.10
0.9	2.75	3,305	680	2.70	4.93	670	4.93	23,283	2.36
1.1	3.25	3,415	715	2.61	4.60	715	4.71	23,104	2.23
CD at 5%	0.25	239	49	0.05	0.28	-	-	-	-
CV%	12.99	10	10	2.48	6.85	-	-	-	-
Spacing (cm)									
60 X 45	2.12	2,722	567	2.57	4.65	617	4.41	15,208	1.82
60 X 60	2.60	3,173	648	2.87	5.12	567	5.59	21,665	2.26
75 X 45	2.35	2,920	609	2.72	4.90	585	4.99	18,543	2.07
75 X 60	2.71	2,959	615	2.90	5.15	557	5.31	19,409	2.14
CD at 5%	0.18	194	31	0.08	0.20	-	-	-	-
CV%	10.46	9	7	4.21	5.59	-	-	-	-

Improvement in nicotine and total nitrogen content in leaf lamina with wider spacing could be due to low competition within crop plants for availability of nitrogen in soil. These results are in agreement with those reported by Upadhyay *et al.* 1994. Consumptive use of water decreased with decrease in plant population. Maximum water use

efficiency was recorded with 60 cm X 60 cm spacing while it was the lowest under 60 cm X 45 cm spacing. The highest net realization (Rs. 21, 665/ha) and BCR (2.26) were realized when the crop was raised with 60 cm X 60 cm plant spacing.

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